

We claim:

1. A voltage-controlled oscillator comprising;

a plurality of inductive elements, each comprising inductively coupled  
first and second inductor element, wherein corresponding ones of said first

5 inductor elements and second conductor elements are connected in series;

a varactor element connected in parallel with said serially connected first  
inductor elements, said same-type varactor element comprising serially-connected  
first and second same-type varactors, each having a well side and a gate side,

means to apply a first tuning voltage to a node common to said first  
10 inductor elements, wherein said first tuning voltage is applied to said gate-side of  
each of said first and second varactors through said first inductor elements and

means to apply a second voltage to a node common to said well-side of  
said first and second varactors.

- 15 2. The oscillator as recited in claim 1, wherein said second voltage is a second  
tuning voltage.

3. The oscillator as recited in claim 2, further comprising:

20 means to apply a bias voltage to a node common to said second inductor  
elements.

4. The oscillator as recited in claim 1, wherein said first and second inductor  
elements of corresponding inductive elements are commonly wound and  
corresponding serially connected first and second inductor elements are mutually  
25 coupled in-phase.

5. The oscillator as recited in claim 1, further comprising:

a second varactor element connected in parallel with second inductor elements associated with said inductive elements, said second varactor element comprising serially-connected same-type first and second varactors, each having a well side and a gate side; and

means to apply said second tuning voltage to a node common to said second varactor element first and second varactors, wherein said second tuning voltage is applied to said well-side of each of said first and second varactors.

6. The oscillator as recited in claim 5, wherein said second voltage is a bias voltage.

7. The oscillator as recited in claim 5, wherein said first and second inductor elements of corresponding inductive elements are reversely wound and corresponding first and second inductor elements are mutually coupled in out of phase.

8. The oscillator as recited in claim 3, wherein said bias voltage is substantially equal to the common-mode value of said first and second tuning voltages, said common-mode substantially equal to half the supply voltage

9. A multi-frequency band voltage controlled tuner comprising:

a parallel arrangement of a voltage controlled oscillator, a multi-band switching means and a transconductor; and

means to provide a bias voltage to said oscillator,

wherein said oscillator comprises:

first and second inductive elements, each comprising first and second inductively coupled inductor elements wherein respective first and second inductor elements are serially connected;

first and second varactor elements, each comprising serially connected first and second same-type varactors, electrically connected in parallel to said serially connected first and second inductor elements, respectively; and

means to provide voltages to a node common within each of said first and said second varactor elements and to said first and second inductive elements.

10. The tuner as recited in claim 9, wherein said voltages are selected from the group consisting of: a first tuning voltage, a second tuning voltage, a bias voltage.

11. The tuner as recited in claim 9, wherein said switching means comprises: a plurality of varactor elements electrically connected in parallel, each varactor comprising two varactors serially connected through an associated well-side, and

means to apply a voltage to a common node of each of said varactors.

12. The tuner as recited in claim 9, wherein said transconductor is operable as a negative resistance device.

13. The tuner as recited in claim 9, further comprising:

a source to provide a known bias voltage to said voltage controlled  
oscillator, said source selected for the group consisting of: current, voltage.

14. The tuner as recited in claim 13, wherein said bias voltage is substantially equal to  
5 the common-node value of said first and second tuning voltages.